6.3 FACILITIES PROVIDED

6.3.1 Aircraft

The Boeing KC-135A is a four-engine, swept-wing aircraft similar to the Boeing 707. KC-135's are primarily operated by the USAF as a refueling tankers; however, this particular KC-135A, NASA 931, which was obtained by NASA in November of 1994, has been modified by NASA to support the Reduced Gravity Program. The predecessor to NASA 931, NASA 930, was obtained by NASA in 1973 and flew over 58,000 parabolas before being retired in 1995.

The KC-135A is operated as a public aircraft within the meaning of the Federal Aviation Act of 1958, as amended, and as such does not require or hold a current airworthiness certificate issued by the FAA. The KC-135A is not operated as a common carrier or as a military transport. Consequently, any individual manifested to board the KC-135A should determine before boarding whether his/her personal life or accident insurance provides coverage under such conditions. Also, since the aircraft will be used under test conditions, all test developers and test subjects will be fully informed of the test plans and of all risks, hazards, and discomforts inherent to such tests prior to flight.

6.3.1.1 Environment

Cabin pressure is maintained between sea level (14.7 psia) and 5,000 feet (12.2 psia) during the parabolic maneuvers. Loss of cabin pressure could result in a pressure as low as 3.5 psia, a factor that must be considered in the design of the test equipment. Normally, cabin temperature varies from 50 to 80 degrees F in flight. The temperature in the cabin is not controlled while the airplane is on the ground. However, if necessary, a portable ground air conditioner is available during preflight operations.

6.3.1.2 Cabin Dimensions (See Figures 1 and 2)

Approximately 60 feet of the compartment length is available for test purposes. Typical cross sections at two locations are shown in Figure 2. The cargo hatch, through which equipment is loaded, is 75 inches high by 118 inches wide. Eighteen inches of width near the top is unusable because of the door-actuating mechanism.

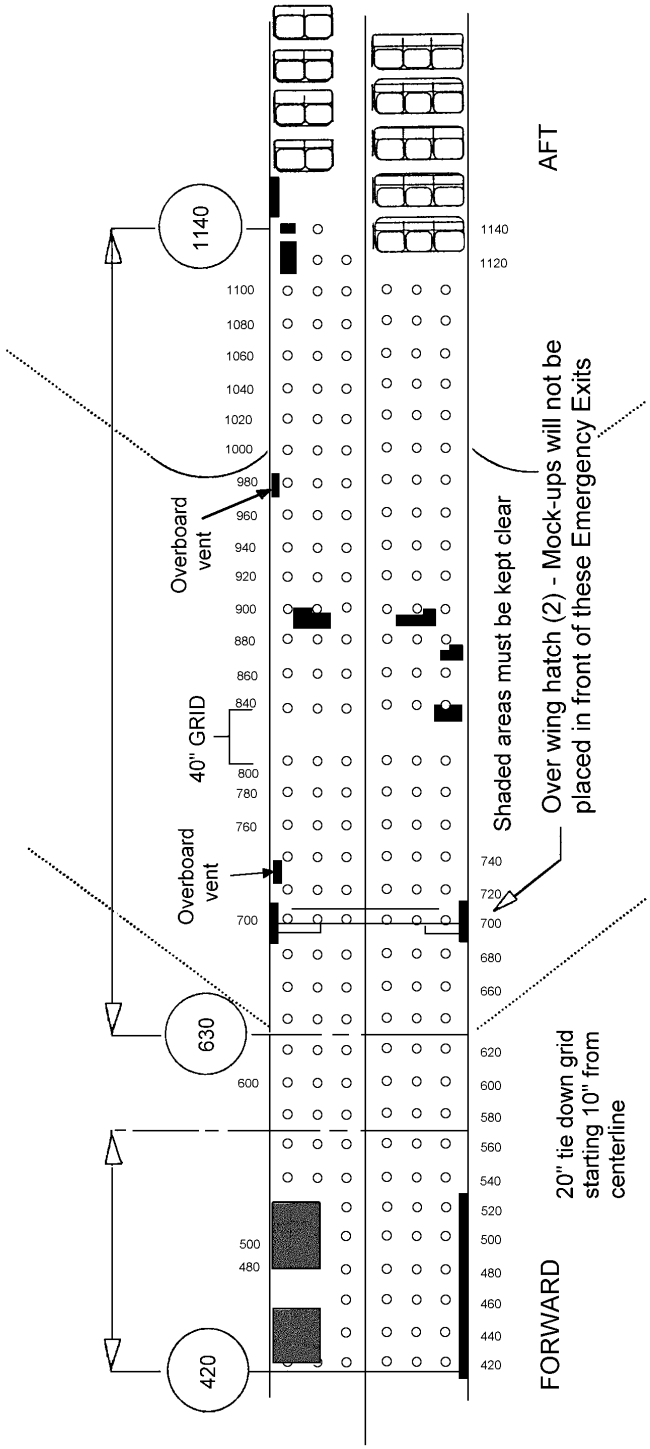
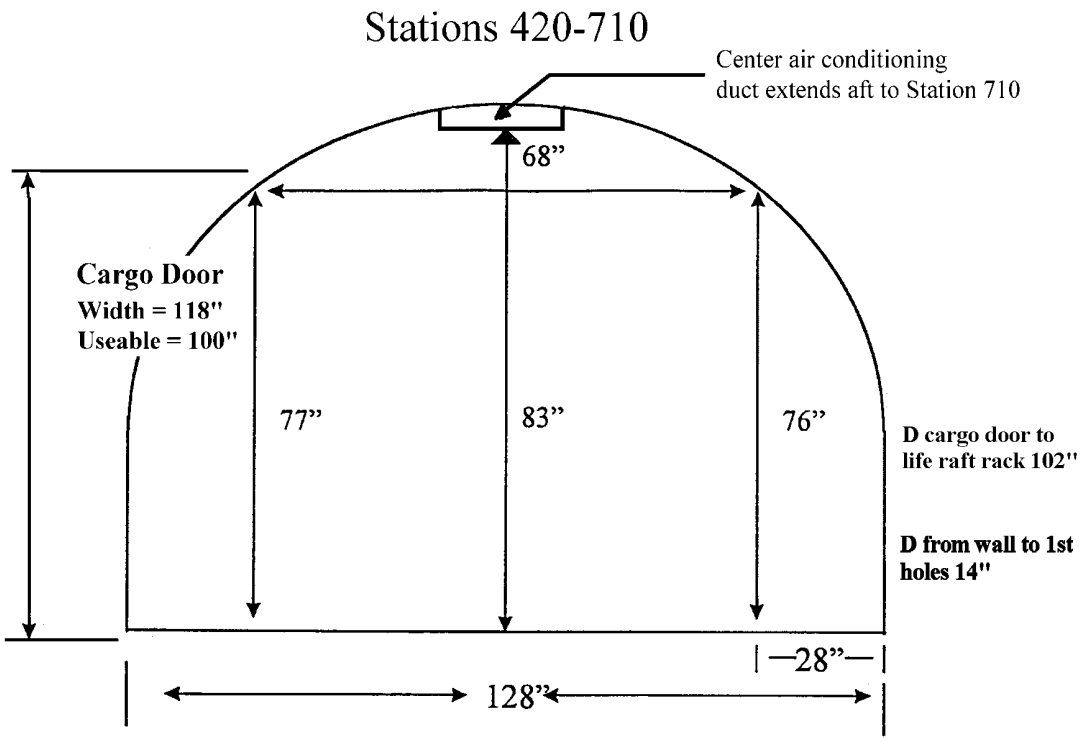


Figure 1 - Floor Grid Pattern



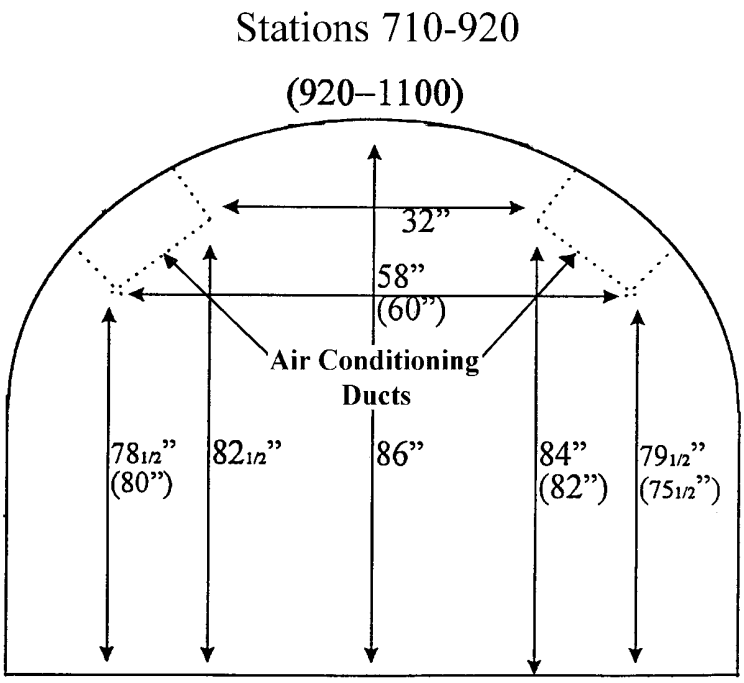


Figure 2 - Cross Section, Looking Forward.

6.3.1.3 Cabin Provisions

The aircraft is equipped with 23 seats aft of the test section. Emergency oxygen devices, life preservers, life rafts, first-aid equipment, and other emergency equipment are provided on board the aircraft.

The interior walls of the cargo compartment are covered with foam padding for the protection of personnel and equipment.

6.3.1.4 Electrical Power and Interfaces

The following electrical power is available in the test section of the aircraft:

1. 28 volt DC — 80 amps
2. 110 volt AC, 400 Hz, three phase — 50 amps per phase (from each of two sources)
3. 110 volt AC, 400 Hz single phase — ~ 50 amps/phase
4. 110 volt AC, 60 Hz, single phase — 110 amps

The aircraft electrical test power is distributed to five power distribution panels at stations 460, 650, 770, 990, and 1090 along the lower side wall of the test section, each with 4 60 Hz duplex outlets with 20 amps/outlet. All power and ground leads from test equipment to these panels should be 20 feet long. The exception to this is the 60 Hz AC power leads, which require the standard three-prong, three-wire, grounded plug. All exposed power leads and electrical contacts should be covered to protect personnel as well as the equipment itself. Use the following table to determine the wire size you will need:

Voltage (AC or DC)	Not to exceed current	Wire size
115	5 amps	20
115	10 amps	16
115	20 amps	12
115	30 amps	10
28	5 amps	18
28	10 amps	16
28	20 amps	12
28	30 amps	10
28	50 amps	6

The maximum research current capability of the entire electrical system on the aircraft for each type of basic power sources above is as follows:

400Hz – 50 amps each phase
60 Hz – generally 30 amps/experiment, can be altered to 120 amps depending on the experiment
28 VDC – 80 amps.

We can convert excess 400Hz 3–phase power to 60Hz aircraft power with approximately 90% efficiency. Connection can be customized as required by the experiment. Connections for 60Hz power are typically 20 amp, 3 prong connector and 30 amp hubble twist lock connector. There are also standard MS connectors on 400Hz and 28VDC power for large current items. Usually, connections for these are via standard MS circuit breakers using lug attachments (#10). Circuit breakers on the power distribution panels are 5 and 10 amp, typically. Larger values are available if requested early. In addition to the aircraft circuit protection, the experiments must be provided with their own circuit protection.

There will be a brief interruption of electrical power during engine startup and momentary interruptions of electrical power may occur during flight. Although infrequent, brief power interruptions may disrupt certain sensitive instruments, and test equipment should incorporate protection devices to prevent data loss.

6.3.1.5 Cryogenic Storage and Supply System

A cryogenic storage and supply system is available to provide a source of breathing air or nitrogen. The cryogenic system has a ½-inch standard AN fitting with a variety of adapters available.

6.3.1.6 High Pressure Gas System

High pressure bottle racks for a supply of inert gases are available; however, the total amount of inert gases on board may be restricted by the test directors for safety reasons. Standard K bottles are used; however, all systems must comply with the restrictions listed in paragraph 6.5.2 of this document.

6.3.1.7 Overboard Vent System

Plumbing is available to allow manual or automatic venting of liquids and/or gases overboard in flight. The dump has a 1¼-inch standard AN fitting with various adapters available from ¼-inch to 1-inch.

6.3.2 Photographic and Television Support

NASA JSC will provide photographers; VHS, SVHS, and MII video; digital photography, 16mm motion-picture documentation medium format, and 35mm film

documentation, and 8" x 10" prints as requested for test documentation. The standard package will provide the test conductor with digital images that will be available on the Internet.

Photographic lights are installed in the aircraft test section. These are sufficient to support photography of most open tests. Additional lighting equipment is available to support enclosed tests or special photography.

Please refer to the Photographic and Television Services Guide in Appendix B for details concerning photographic and videographic capabilities and product availability schedules.

6.3.3 Ground Facilities

Approximately 1,760 square feet of air conditioned workspace is available in Building 993 for test equipment buildup and checkout. Access to this area is through two l2' x l2' roll-up doors. In addition, a briefing room provides tables, desks, chairs, phones, a VCR, and a video monitor.

6.3.3.1 User Phones

Phones are provided in the briefing room. All long distance charges must be handled collect or third party by the test developer. Incoming calls for the test developer should use the following numbers:

Main Office: 281-244-9874
Briefing Room: 281-244-9005
Fax: 281-244-9500

6.3.3.2 Normal Duty Hours

The Reduced Gravity Office operates Monday through Friday from 0730 to 1600. Test developer access to the test equipment buildup room is limited to these hours unless prearranged with the Reduced Gravity Office. Access to the aircraft is normally limited to no later than 1500.

6.3.3.3 Security

Access to Building 993 is controlled, and the building is locked after normal duty hours. However, personal valuables should not be left unattended. The test developer is responsible for providing additional security, if required. In addition, all non-JSC individuals must obtain a temporary security badge prior to flight-line access at Ellington Field. These badges are obtained at the Security Office in Building 110 at JSC.

6.3.3.4 Storage

Very limited storage space is available in Building 993 and must be prearranged with the Reduced Gravity Office. Any equipment left in Building 993 following a test period will be disposed of by test directors.